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RECOMMENDED MODIFICATIONS OF THE DESIGN OF THE INNER BELT

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RECOMMENDED MODIFICATIONS OF THE DESIGN OF THE INNER BELT

Being a reaction to the Inner Belt Proposals of the State Department of Public Works, designed by the engineering firms of Hayden, Harding & Buchanan and Charles Maguire & Associates, between the Charles River and Massachusetts Avenue in Boston.

I Introduction

II Scope of Work

III Summary of Alternative Proposal Recommended

IV Further Details of the Alternative Proposal

V Rejected Alternative Proposals

BRA Comprehensive Planning Division - Inner Belt Study

January 9, 1963

RECOMMENDED MODIFICATIONS OF THE DESIGN OF THE INNER BELT EXPRESSWAY

Being a reaction to the Inner Belt proposals of the State Department of Public Works between the Charles River and Massachusetts Avenue in Boston.

Illustrations accompanying this report are listed below.

Fig. 1:	Map showing recommended alternative proposal; scale 1" = 400'
Fig. 2:	Section through the Fens; scale 1" = 20'
Fig. 3:	Sectional perspective of the Fens
Fig. 4:	Map showing the D.P.W. proposal; scale 1" = 400'

Note: Additional information, maps at a scale of 1" = 200', concerning Building Conditions, Land Use, Recommended Alternative Proposal and the D.P.W. proposal, and drawings of other rejected alternative proposals are also available.

I INTRODUCTION

The basic route and design criteria of the Inner Belt proposals of the State Department of Public Works are accepted in principle, but additional investigation was necessitated, primarily in order to assure that further D.P.W. engineering recognizes the renewal objectives of the Authority.

II SCOPE OF WORK

A. to review the design and alignment of the Inner Belt as proposed by the engineers for the State Department of Public Works, between the Charles River and Mass. Avenue in Boston.

B. To adapt it to the new street system of the Regional Core as developed in recent months of the project and Inter-Area planning.

C. To investigate alternative refinements of the alignments and methods of design of the highway in relation to local design and renewal considerations.

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III SUMMARY OF ALTERNATIVE PROPOSAL RECOMMENDED:

The design illustrated in plan form in Figure One is the result of an investigation into four different alternative proposals for the Inner Belt, which progressively considered major factors affecting the design of the Belt and which our renewal objectives would indicate need further scrutiny. The other three alternative proposals were rejected for certain reasons, and those will be explained in part of this report.

Briefly the major changes that are proposed are as follows:

A. The adaptation of the design to the street system proposed in the Inter-Area Regional Core Sketch Plan and agreed to by the Wilbur Smith consultants.

B. The relocation westwards of the intersection of the Inner Belt with the South-West Expressway.

C. The modification of the system of one-way parallel service roads on either side of the Inner Belt where it passes through the Fens.

D. The depression and shifting of the alignment of the Inner Belt through the Fens.

IV FURTHER DETAILS OF THE RECOMMENDED ALTERNATIVE PROPOSAL

The notes given below expand the description of each of the major changes, give a comparison with the D.P.W.'s proposals, and justify the changes involved.

A. Adaptation to the Regional Core Street System

With the provision that the recommendations of the Regional Core Sketch Plan, as agreed to with the Wilbur Smith consultants, on major circulation and street flows are to be accepted, it became an essential task to adapt the D.P.W. proposals for the Inner Belt to the systems of local arterial movement. This system did not exist as a proposal when the D.P.W. plans were prepared, and their engineers' proposals are therefore based on an assumption of the continuance of the present system of circulation without the aid of urban renewal to achieve better local connections.

The two most radical changes involved the South-West Expressway Extension and the Riverway/Boylston Street intersection. The Expressway Extension is designed primarily as a direct continuance of the Expressway northwards into downtown Boston parallel with the tracks of the existing New Haven railroad. Its connection to the Inner Belt is deliberately kept relatively minor in character as there should not be any great desire to circuit the Inner Belt and penetrate downtown Boston from this direction. To encourage such movements would effectively weaken the concept of the Inner Belt as a regional by-pass road. In their proposals the D.P.W. had already suggested an extension to the South West Expressway, in the form of long access ramps spanning across the Inner Belt and feeding directly into Columbus Avenue and Tremont Street (Fig. 4). The problems created by feeding directly into the existing local street system are obviated by the proposed Expressway Extension which acts as a distributor into a newly classified local street system.

The Riverway/Boylston Street alignment has been selected as the major two-way radial feeder to the Charlesgate area. This leaves Brookline Avenue, which penetrates the institutional concentration as a minor local feeder road. The junction between the Inner Belt, Brookline, and Riverway/Boylston is envisaged as a three level intersection. The Inner Belt would be 20 feet below Brookline Street, which would remain at ground level. Boylston Street would be connected to Riverway by a direct overpass avoiding the intersection at ground level between Brockline Street and the Inner Belt service roads. To solve this latter intersection, and to accommodate the various ramps and turning movements desired, a rotary system has been designed, in which the rotary movement is momentarily halted to allow the traffic from the three ramp entry points to feed into the rotary.

Apart from the above two changes, only minor alterations are required to allow the new street system to feed into the parallel service road system of the Inner Belt.

B. Relocation of the Intersection

The intersection of the Inner Belt with the South-West Expressway has been relocated to the westwards and designed more compactly as a more direct expression of its function for the following reasons:

1) The new intersection acquires and occupies considerably less land than the D.P.W. proposals. About 350 households would be displaced by the new position of the intersection as compared with about 800 households that would be displaced by the D.P.W. proposal, obviating the relocation

of some 450 households.

2) To construct the new intersection more larger type buildings and more buildings of "B" and "C" structural condition must be acquired than is necessary in the D.P.W.'s intersection, but taken as a whole, the new intersection only takes 75% of the total structures acquired for the D.P.W.'s proposal.

   Furthermore, the new location of the intersection leaves a much more viable situation with respect to new light industrial and residential development when the time is ripe.

   Buildings taken for Inner Belt/South-West Expressway Intersection.

	DPW Proposal	Alternative Proposal
Residential	334	212
Commercial	44	56
Institutional	18	17
Industrial	14	16
Recreational	2	1
Total structures	412	302
Occupied dwelling units	800	350

3) Less land is isolated or "sterilized" in the interstices of the intersection and in the loop between the South-West Expressway and the railroad.

   It makes available to North Roxbury a significant area of existing "soft" development for a new and more productive land use proposal, which in the D.P.W. layout was for the most part occupied by their large intersection. The recent Regional Core Sketch Plan indicates an opportunity for an important new light industrial land use in the area made available by the relocation of the intersection.

4) The intersection passes between the existing public housing projects of Mission Hill Extension in the Parker Hill/Fenway GNRP and the Whittier Street project in the North Roxbury GNRP; whereas the location of the D.P.W.'s intersection physically cuts off the latter housing project from the facilities of its own area.

It should be noted that the direct connectors of the revised intersection pass on average within 60 feet of the closest buildings of both of the housing projects, and at these points are about 10 feet below existing ground level, whereas in the D.P.W. proposal they passed within 100 feet of the Whittier Street project on an elevated viaduct, which at this point was about 30 feet high.

In addition the new intersection retains the church of St. Francis de Sales, which was razed in the D.P.W. proposals

5) The new intersection provides a considerably better connection from the South-West Expressway to the arterial extension to Copley Square parallel with the New Haven Railroad, as proposed in the Regional Core Sketch Plan.

6) In the time and resources of this study, it was not possible to make a comparative cost estimate between the two intersection proposals. However, comparative physical characteristics indicate that the alternative proposal is cheaper than the D.P.W. solution. This finding is based on the fact that the alternative intersection is more compact, uses less road area, and is generally excavated deeper thereby reducing the amount of viaducting.

It should be noted that the intersection has been compressed without sacrificing the two major Federal standards for Interstate highway design, namely, a minimum radius of 850 feet and a maximum grade of 3% on all expressways and direct connectors.

C. Modification of services roads

The system of one-way parallel service roads on either side of the Inner Belt has been modified between Brookline and Parker Streets to a two-way service road, on the southern side only of the Inner Belt. This modification has been made for the following reasons:

1) With the elimination of Park Drive as a major radial feeder to the Charlesgate area, and its relegation to the role of a local service collector and pleasure drive road, it became unnecessary to span across the Fens with an arterial road at this critical joint in the Fen park system. We would strongly prefer instead to preserve the continuity between the broader more natural part of the

Fens and the narrower and more formal part, assuming that the park system as a whole is maintained.

2) The elimination of a service road spanning across the Fens at this point would allow the development of a large public recreational facility at the joint between the "natural" Fens and the "formal" Fens, mentioned above, and the green square formed by Evans Way. This point had been previously determined by the Inter-Area Planning Group and the Parker Hill-Fenway GNRP project team as one of special value for the injection of new interests and activities into the Fens, greatly increasing the vitality, safety, and usefulness of the Fens as a major recreational resource.

(Refinement of this concept to a point where it can be discussed with the MDC and the Park Department is now a part of the Parker Hill team work program assumptions.)

3) The elimination of a service road along the line of Park Drive on the north side of the Fens would simplify the complex rotary traffic movements in the new intersection at the Riverway/Boylston Street intersection. This would also minimize the traffic nuisance for local residential and institutional uses, created by the parallel service road system.

4) This proposal would also enable the closing of Museum Road, so that the Museum School of Art became physically part of the same street block with the Museum of Fine Art, and provide additional parking for the Museum to replace their existing parking lot, which will be developed for a new wing for the Museum.

In connection with the modification of the service road system for the preservation of the Fens, it has also been possible to modify the route of the Inner Belt. At a point where the engineers had proposed to split the Inner Belt to either side of the Museum School of Art, it is now proposed to place both roadways on the south side of the School. This will eliminate the diverging highways proposed by the engineers in the Fens, and will allow the type of major public recreational developments outlined in C (2) above.

The other improvement to the D.P.W.'s proposals comes as a direct result of the new plan to combine the two traffic directions mentioned above. This combination now makes it possible to align the Inner Belt into two straight sections; one from Charles River to the Fens and the other from a point just to the east of Parker Street to Harrison Avenue. In this manner the road represents a much cleaner land taking pattern and safer alignment and for the most part is only a matter of a few feet from the alignment of the curvilinear proposals put forward by the engineers.

D. Depression through the Fens

From the western portal of the tunnel, under the Museum School of Art, the Inner Belt has been kept depressed throughout its passage of the Fens, at about 20 feet below existing ground level, until its intersection with Brookline Street, where it begins the upward incline towards the bridge crossing the Charles River.

In addition, the depressed Inner Belt has been moved southwards under the adjacent service road(as shown in the section and perspective in Figures 2 and 3). The above proposed revisions have been made for the following reasons:

1) To gain as much width as possible in which to make a significant re-design of the recreational and visual amenities of the Fens, and accomplish a pedestrian linkage across the Fens between the institutions on the south side and their residential areas on the north side. Thereby to preserve the physical continuity of the Fens as an established recreation park, a topographical and historical line of drainage and separation, and as a precedent against further encroachment into the Fens in the future. The D.P.W. proposals for the Inner Belt had destroyed this area of the Fens completely, with the exception of grass verges, and in addition, their proposals had been for a road just a few feet below existing ground level, which would be highly damaging to the general environment and to the property values of the vicinity. This technical staff opinion is supported by the anxiety expressed to the Project Director of the Parker Hill-Fenway GNRP by several institutional groups and to the Planning Dept. of the BRA by numerous park, historical and architectural groups.

2) To provide a "doorstep" and essential open space to the established concentration of institutional uses in the area and to provide a link with their residential accommodations on the opposite side of the Fens. It seems possible that careful design might in the future allow limited air rights development over the Inner Belt at this point. This would provide a potential institutional expansion on tax free land which had already been developed for highway usage. Therefore the tax base would be protected for future expansion of the Fenway institutions.

The approximate extra cost of the above proposal taken from Brookline Street to Evans Way would be about $3,090,000 according to cost assumptions given us by Mr. Orpin. As a rough guide the estimated cost of land acquisition and construction of the Inner Belt and service roads between Beacon Street and the New Haven Railroad is $30,860,000. Thus, the alternative proposal represents about a 10% increment of cost to achieve a solution which will go a long way to removing objections that have been repeatedly raised against the proposed route of the Inner Belt.

Alternatives: At this point it should be mentioned that the detailed cross section of the above proposal is but one of at least three alternative proposals for depressing the Inner Belt in its passage through the Fens that have been investigated.

An alternative proposal, keeping the Inner Belt along the center of the Fens on the present alignment proposed by the D.P.W., but depressing it completely in a tunnel built by the cut and cover method, would cost about $3,170,000 in excess of the D.P.W. proposal. The scheme was rejected on the grounds of cost, relative to the benefits gained for the park, and also because it provided uncomfortable driving conditions, alienating the motorist from the environment through which he was passing.

The other alternative proposal considered, was broadly similar to the one eventually recommended, but it differed in that the Inner Belt was not moved southwards under the service road, but was located immediately adjacent to it, and depressed in a cut. In this scheme several broad pedestrian platforms would bridge the Inner Belt at intervals to minimize the effect of the road and provide direct contact between the institutional area on the one side, and the residential area on the other. The proposal was estimated to cost about $850,000 in excess of the D.P.W. proposal, but it was rejected on the grounds that it would not provide a substantial restoration of the amenities of the existing Fens, and allowed the Inner Belt to dominate the area too much.

We strongly recommend that the expenditure of some $3,000,000 represents a necessary and worthwhile cost for re-couping local environmental losses caused by the construction of the Inner Belt.

V REJECTED ALTERNATIVE PROPOSALS:

As mentioned earlier, the scheme for modifying the Inner Belt that has been described in detail above was arrived at through an investigation into four different proposals for the Inner Belt. These proposals started from the simplest changes and progressively considered a number of major desirable alternatives to the D.P.W. proposals. Briefly the four stages in this evolutionary process were as follows:

A. As the minimum position, to accept the D.P.W. proposals for the Inner Belt and with minor adjustments to partially adapt them to the street system proposals of the Regional Core Sketch Plan.

B. As stage two position, but in addition to stage one above, to unite together both channels of the Inner Belt on the south side of the Museum School of Art, to depress the Inner Belt throughout the length of its passage through the Fens, to move the Inner Belt southward under the adjacent service road, and to omit the northern service road between Brookline Street and Huntington Avenue.

C. As stage three position, but in addition to stages one and two above, to move the intersection with the South-West Expressway westwards and to refine the general horizontal alignment of the Inner Belt. This is the recommended proposal described in detail in Section IV.

D. As stage four position, to investigate the possibility of omitting altogether the system of one-way parallel service roads on either side of the Inner Belt, and instead to feed by ramps directly from the Belt into the radial artery streets.

Stages A-C form a progressive evolution stemming from the D.P.W. proposals for the Inner Belt. Their various advantages are cumulative and are described in detail in Section IV of this Report.

Stage D, however, marked a radical re-thinking of the whole functioning of this section of the Inner Belt design, and in particular, of the parallel service road system. Dick Green

for Parker Hill and Dick Lockhart for South End, asked that we analyze this alternative vis a vis community interests in mitigating the local effects of the Expressway and the accompanying encouragement of non-residential land use change.

Basically, alternative proposal D accepted the advantages gained in alternative position C above, but in order to minimize the detrimental effect of an expressway on its surroundings, the design proposal omitted the dual parallel service road system. In its place, four major city radial roads, crossing the Inner Belt at right angles and at fairly regular intervals, were chosen as ramped entry and exit points to the Belt. These roads were Brookline Street, Parker Street, a realigned Columbus Avenue and Harrison Avenue. At this point in our study, certain problems which eventually caused the rejection of the scheme became apparent, and are enumerated below:

1) Probably the greatest difficulty of all would have been caused by the exit ramps from the Inner Belt, which because of their frequency were, of necessity, relatively short, and led directly into signalized intersections. Even with free right turns and two lane ramps there would have been a serious danger of vehicles waiting to turn at the signals "backing up" onto the Inner Belt. Normally, the "back-up" at this type of intersection is absorbed by the parallel service road system.

2) Similarly, vehicles waiting in the radial streets of the city, to turn onto the entry ramps of the Inner Belt, would have required stacking lanes which would have necessitated the acquisition and demolition of additional valuable properties other than those normally required for the intersection. Direct unloading of vehicles from the Inner Belt into the city streets would have meant fairly continuous congestion at these points of intersection.

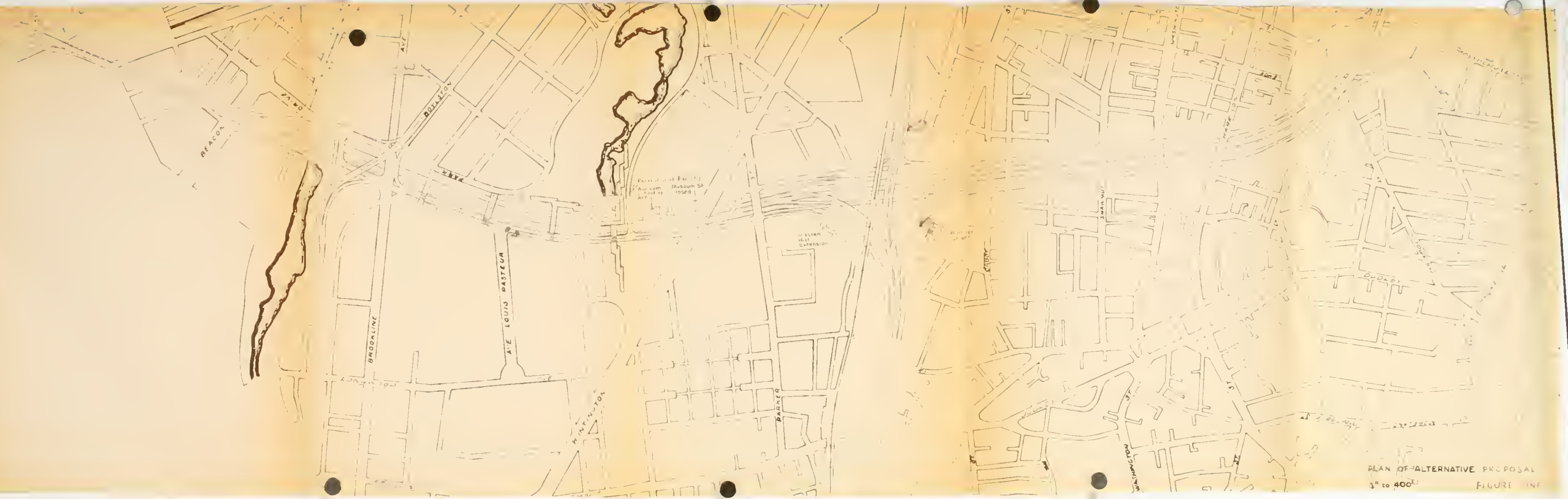
3) The omission of a service road system would have meant the loss of taxes to the city, as a service road, because of its easy access to a good line of communication, enhances the value of properties along it.

4) The frequency and regularity of ramps (four exit and four entry ramps in less than 2 miles) might violate the requirements of the Federal Bureau of Roads for qualification for a grant as an Interstate highway with limited access. The number of accesses would reduce the speed of the highway.

5) The frequency of ramps would necessitate an extra weaving lane between the bottom of an entry ramp and the bottom of an exit ramp.

6) The line of the Inner Belt is paralleled for some distance by existing roads which serve to connect together the radial streets of the city, and would thus assume the roles of service roads.

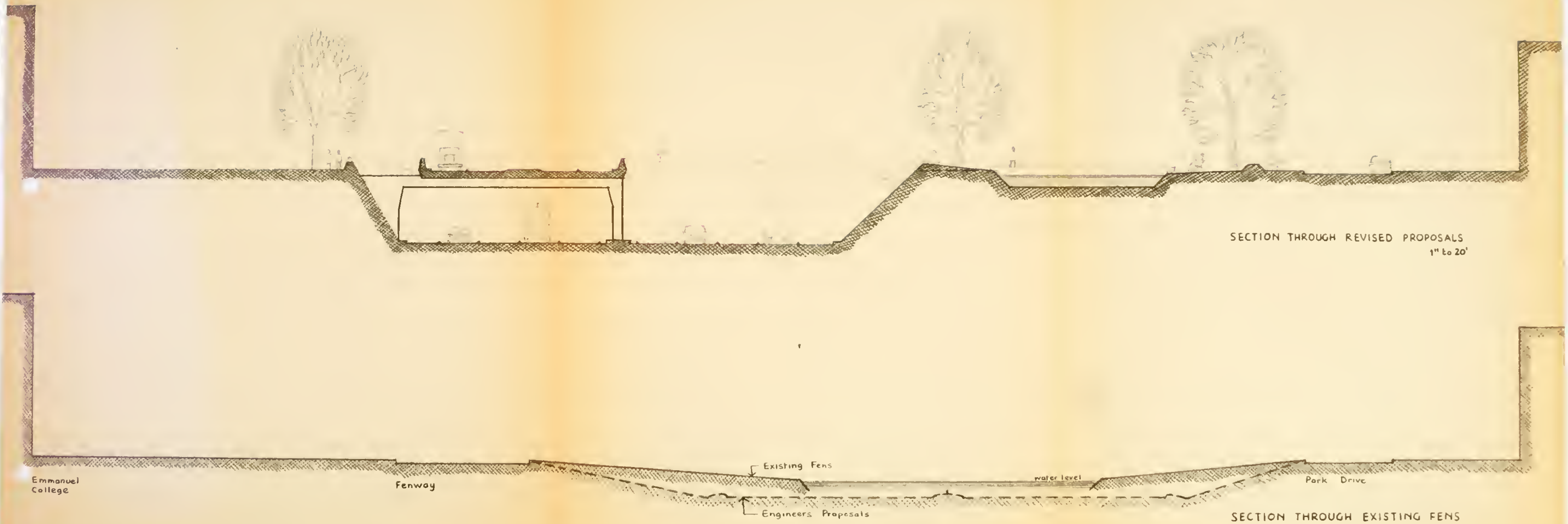
We are forced to conclude that while elimination of parallel service roads is theoretically desirable to mitigate impact of the expressway on residential districts, it is not worthwhile to attempt to do so in this case. We would, instead, advocate use of strict urban renewal planning and design controls on all land adjacent to the Inner Belt, in order to prevent undesirable development occurring. Local traffic congestion is not apt to be reduced by eliminating the parallel service roads.



PLAN OF ALTERNATIVE PROPOSAL

1" to 400'

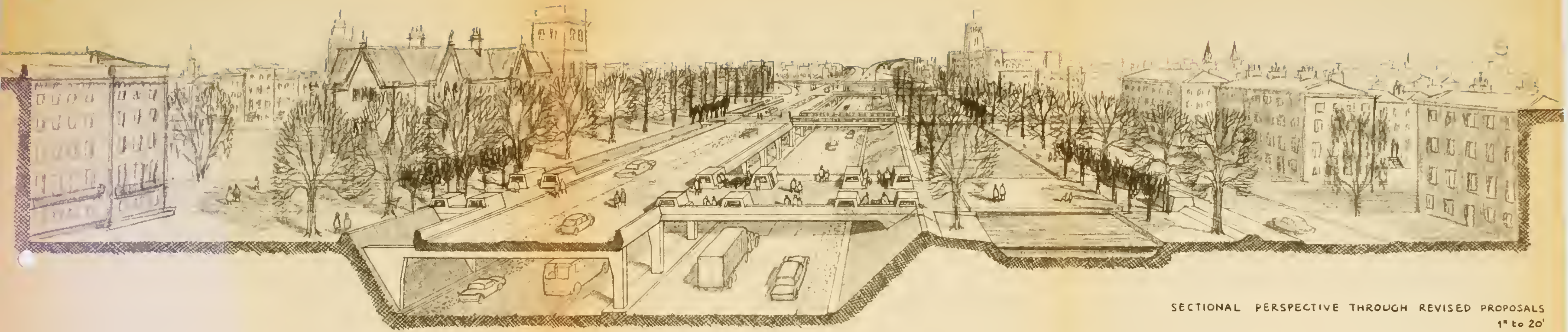
FIGURE ONE



SECTION THROUGH REVISED PROPOSALS
1" to 20'

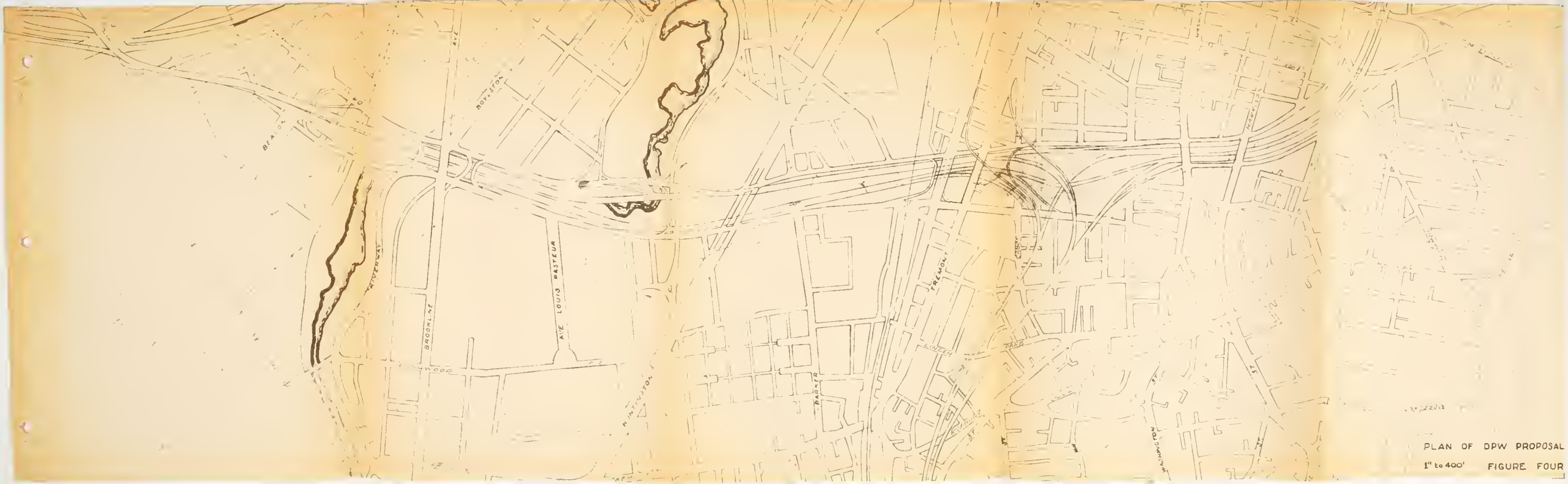
SECTION THROUGH EXISTING FENS
AND ENGINEERS PROPOSALS 1" to 20'

FIGURE TWO



SECTIONAL PERSPECTIVE THROUGH REVISED PROPOSALS
1" to 20'

FIGURE THREE



PLAN OF DPW PROPOSAL

1" to 400' FIGURE FOUR

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